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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,976	02/01/2005	Radivoje Popovic	6305-0009WOUS	6655

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EXAMINER

WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
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2862

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/522,976	Applicant(s) POPOVIC ET AL.	
	Examiner Kenneth J. Whittington	Art Unit 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-31 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 12-15, 18, 19, 21, 22, 24, 25 and 27-30 is/are rejected.
- 7) ☒ Claim(s) 16, 17, 20, 23, 26 and 31 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/1/05</u> . | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION***Claim Objections***

Claim 29 is objected to because of the following informalities: "magnetization" in line 10 has a typographical error and should be "magnetization". Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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Claims 11, 18, 21 and 29 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3 of U.S. Patent No. 7,038,448 in view of Tong et al. (US5,199,178), hereinafter Tong. Regarding claims 11, 18, 21 and 29 of the present application, claims 1 and 3 of '448 teaches all the features of the present application including a core having inner and outer edges, but does not specifically recite the core being ring shaped. Tong teaches using a ring-shaped core in a magnetic field measuring apparatus (See Tong FIG. 1, note ring core). It would have been obvious at the time the invention was made to incorporate a ring-shaped core into the recited apparatus of '448. One having ordinary skill in the art would have been motivated to do so because as noted in Tong, such core is the most common configuration of a core in such magnetometers and provides a sensor with good sensibility and simple in construction and design (See Tong col. 1, lines 31-63).

18

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12 Claims 12-15, 18, 19, 29 and 30 are rejected under 35

U.S.C. 102(e) as being anticipated by Berkcan (US6,750,644).

Regarding claim 12, Berkcan discloses a magnetic field sensor comprising:

a ring-shaped ferromagnetic core attached to a semiconductor chip that spans a plane with the at least one component of the magnetic field to be measured and that serves as magnetic field concentrator, whereby the ferromagnetic core is magnetized with a predetermined magnetization (See FIGS. 1, 2, 5 and 6, item 14, see also col. 7, lines 15-52, note also that the coil provides a calibration current to provide a predetermined magnetization of the core depending on the current in the coil, see col. 2, line 54 to col. 3, line 63),

a read-out sensor, whereby the read-out sensor comprises at least one sensor that is integrated into the semiconductor chip and arranged in the vicinity of an outer edge of the ferromagnetic core and that measures the at least one component of the magnetic field (See FIGS. 1, 2, 5 and 6, item 18), and

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an excitation coil and an electronic circuit for the temporary application of a current to the excitation coil in order to restore the predetermined magnetization in the ferromagnetic coil (See FIGS. 1, 2, 5 and 6, item 38, and col. 3, line 64 to col. 5, line 12, note that during operation, the
6 coil is energized to restore the predetermined calibration magnetization during measurement).

Regarding claim 13, Berkcan discloses the ferromagnetic core is circularly magnetized (See FIGS. 1, 2, 5 and 6, note orientation of coil to core).

Regarding claims 14 and 15, Berkcan discloses the
12 excitation coil comprises at least one winding that encloses the ring of the ferromagnetic core (See FIGS. 1, 2, 5 and 6, item 36).

Regarding claims 18 and 19, Berkcan discloses the read-out sensor comprises at least one Hall element (See FIGS. 1, 2, 5 and 6, item 18).

18 Regarding claim 29, Berkcan discloses a method for operation of a magnetic field sensor for the measurement of at least one component of a magnetic field, in which the magnetic field sensor comprises a ring-shaped ferromagnetic core attached to a semiconductor chip the ferromagnetic core spanning a plane with the at least one component of the magnetic field to be

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measured and serving as magnetic field concentrator (See FIGS. 1, 2, 5 and 6, item 14, see also col. 7, lines 15-52), and a read-out sensor having at least one sensor integrated into the semiconductor chip and arranged in the vicinity of an outer edge of the ferromagnetic core whereby the read-out sensor measures
6 the at least one component of the magnetic field (See FIGS. 1, 2, 5 and 6, item 18), the method comprising the step of magnetizing the ferromagnetic core at specific times by temporary application of a current to an excitation coil for restoring magnetization of the ferromagnetic core (See col. 2, line 54 to col. 5, line 25, note the core is magnetized using
12 the coil during specific times during operation to achieve the calibration magnetization in the core).

Regarding claim 30, Berkcan discloses the current applied to the excitation coil for restoring the magnetization of the ferromagnetic core is a direct current pulse, whereby a maximum of the direct current pulse produces a magnetic field that is
18 greater than a coercive field strength of the material of the ferromagnetic core (See col. 2, line 54 to col. 5, line 25, note that the current pulse applied to the coil has a duration corresponding to a measurement time and the current is strong enough to create the predetermined calibration magnetization of the core).

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Claims 12-15, 18, 19, 21, 22 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Extance et al.

(US4,692,703), hereinafter Extance. Regarding claim 12, Extance discloses a magnetic field sensor comprising:

6 a ring-shaped ferromagnetic core attached to a semiconductor chip that spans a plane with the at least one component of the magnetic field to be measured and that serves as magnetic field concentrator, whereby the ferromagnetic core is magnetized with a predetermined magnetization (See Extance FIGS. 3-5, note core 11' and 20, note also that the coil
12 provides a calibration current to provide an alternating predetermined magnetization of the core depending on the current in the coil, see FIG. 3, item 15, note also that assembly is incorporated with ceramic chip 10),

18 a read-out sensor, whereby the read-out sensor comprises at least one sensor that is integrated into the semiconductor chip and arranged in the vicinity of an outer edge of the ferromagnetic core and that measures the at least one component of the magnetic field (See FIGS. 3-5, items 13 or A and A'), and

an excitation coil and an electronic circuit for the temporary application of a current to the excitation coil in order to restore the predetermined magnetization in the

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ferromagnetic coil (See FIGS. 3-5, coil 14 and circuit shown, note that during operation, the coil is alternatively energized which restores the predetermined magnetization during measurement, i.e., the peak of the waveform is periodically restored and the valley of the waveform is periodically
6 restored).

Regarding claim 13, Extance discloses the ferromagnetic core is circularly magnetized (See FIGS. 3-5, note orientation of coil to core).

Regarding claims 14 and 15, Extance discloses the excitation coil comprises at least one winding that encloses the
12 ring of the ferromagnetic core (See FIGS. 3-5, items 14 and core 11' and 20).

Regarding claims 18 and 19, Extance discloses the read-out sensor comprises at least one Hall element (See FIGS. 3-5, item 13, A and A').

Regarding claims 21 and 22, Extance discloses two Hall
18 elements arranged at diametrically opposite locations in the relation to an axis of symmetry of the core (See FIG. 5, note sensor A and A').

Regarding claim 29, Extance discloses a method for operation of a magnetic field sensor for the measurement of at least one component of a magnetic field, in which the magnetic

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field sensor comprises a ring-shaped ferromagnetic core attached to a semiconductor chip the ferromagnetic core spanning a plane with the at least one component of the magnetic field to be measured and serving as magnetic field concentrator (See FIGS. 3-5, note core 11' and 20 and chip 10), and a read-out sensor
6 having at least one sensor integrated into the semiconductor chip and arranged in the vicinity of an outer edge of the ferromagnetic core whereby the read-out sensor measures the at least one component of the magnetic field (See FIGS. 3-5, items 13, A and A'), the method comprising the step of magnetizing the ferromagnetic core at specific times by temporary application of
12 a current to an excitation coil for restoring magnetization of the ferromagnetic core (See FIGS. 3-5, item 15, note the core is magnetized using an alternating current in the coil which during specific times restores predetermined magnetizations in the core, i.e., the alternating peaks and valleys are continually restored during use).

18

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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6 (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
- 18 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 24, 25, 27 and 28 are rejected under 35 U.S.C.

103(a) as being unpatentable over Extance. Regarding these claims, Extance teaches all the feature of the claims except for 24 the particular dimensions. Nonetheless, modifying Extance to have the relative dimensions as recited in the claims would be obvious to one having ordinary skill in the art through routine experimentation because where the where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having 30 the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably

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distinct from the prior art device. See *Gardner v. TEC Systems, Inc.*, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 225 USPQ 232 (1984). Because Extance teaches the general features of the claims, it teaches the relative dimensions recited in the claims.

6

Allowable Subject Matter

Claims 16, 17, 20, 23, 26 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12 The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 16, 17, 20, 23 and 26, the prior art does not show or teach radially magnetizing the core, in combination with the other features of the claims.

18 Regarding claim 31, the prior art does not teach alternatively providing DC pulses to the core via the coil in opposite directions and summing the output signals therefrom, in combination with the other features of the claims.

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Conclusion

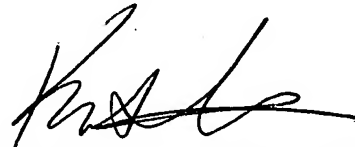
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US5,982,176, US5,583,429, US4,963,827, US4,849,696 and US4,059,798 each disclose varying designs for magnetic field sensors using ring shaped cores, exciting coils and Hall or MR sensors to measure the magnetic fields therefrom.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Kenneth J Whittington
Examiner
Art Unit 2862

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